

Patent Claims

1. Light source element (10; 50), comprising
 - a light waveguide (1; 51) that
 - comprises a light exit face (1, 1A) and whereby
 - 5 -- that surface (1B, 51B) lying opposite the light exit face (1A; 51A) and at least some of the lateral surfaces (1C, 1D; 51C; 51D) of the light waveguide (1; 51) connecting the light exit face and the opposite surface are covered with reflectors (4; 54) that reflect or diffusely return light, as well as comprising
 - at least one light infeed unit (5, 25, 35, 45; 55; 65) arranged at a light entry face 10 (5B) of the light waveguide,
characterized in that the light entry face (5B; 54A) and/or the light exit face (1A, 51A) of the light waveguide is arranged at an acute angle relative to one of the principal directions of the light waveguide.
2. Light source element according to claim 1, characterized in that the light 15 infeed unit comprises an aperture region (5B, 25B, 35B) of the respective reflector (4, 24, 34) and a light source (5A, 25A, 35A) arranged in front of the aperture region (5B) such that
the light radiation emitted during operation by the light source (5A) penetrates into 20 the light waveguide (1, 21, 31) with an oblique angle.
3. Light source element according to claim 2, characterized in that at least 25 one triangular projection is formed in at least one longitudinal lateral surface (1C, 1D or the surface (1B) of the light waveguide (1, 21, 31), the one lateral surface of said projection being covered by a reflector (4, 24, 34) and the other lateral surface thereof lying free toward the outside and thus forming the aperture region (5B, 25B, 35B).
4. Light source element according to claim 1, characterized in that the light waveguide (51) comprises such a shape that the light exit face (51A) and the surface (51B0 of the light waveguide (51) lying thereopposite describe an angle (α) differing from zero.
- 30 5. Light source element according to claim 2 or 4, characterized in that the light exit face (1A; 51) and/or the surface of the light waveguide lying thereopposite comprises light-scattering sections (6; 56) and plane sections (7; 57), and the areal

ratio of the plane sections (7; 57) to the sections (6; 56) along the light waveguide is set such that a uniform luminance of the light source element (5) is achieved.

6. Light source element according to one of the preceding claims, characterized in that the reflectors (3; 54) are integrally connected to one another.

5 7. Light source element according to one of the preceding claims, characterized in that the material of the reflectors (4, 24, 34) is capable of being injection molded and the reflectors (4, 24, 34) are manufactured by injection molding.

10 8. Light source element according to one of the claims 1 through 6, characterized in that the material of the reflectors (4) is formed of a thermoplastic polyester, particularly on the basis of polybutyleneterephthalate.

9. Light source element according to one of the claims 1 through 6, characterized in that the material of the reflectors (4, 24, 34) is Pocan®.

15 10. Light source element according to one of the claims 1 through 5, characterized in that the reflectors are formed of a reflective or diffusely back-scattering film (64, 74).

11. Light source element according to claim 10, characterized in that the film is formed on the basis of polycarbonate.

20 12. Light source element according to claim 10 or 11, characterized in that one or more openings are potentially formed in the film (64, 74) for the passage of the light radiation.

25 13. Light source element according to one of the preceding claims, characterized in that the light waveguide (71) comprises a projection (71A) that is salient beyond a lateral surface and aligns with the light exit surface (73), at least one light source (75) being arranged under said projection.

14. Light source element according to claim 13, characterized in that the surface of the projection (71A) facing toward the light source (75) is likewise covered with the film (74).

30 15. Light source element according to one of the claims 10 through 14, characterized in that the film is coated or printed with white color.

16. Light source element according to one of the preceding claims, characterized in that it forms a closed ring.

17. Light source element according to one or more of the preceding claims, characterized in that the at least one light source is a semiconductor light-emitting diode.

18. Liquid crystal display with a light source element according to one or more of the preceding claims, characterized in that a liquid crystal element is arranged at the side of the light exit face.

19. Liquid crystal display according to claim 18, characterized in that the liquid crystal element is held spaced from the light exit face by spacers.

20. Method for manufacturing a light source element, comprising the method steps

- manufacturing a light waveguide in an injection molding process, whereby
 - a mold of an injection molding apparatus provided therefor has its bottom surface and at least at part of the lateral surfaces lined with a film that reflects or diffusely back-scatters light,
 - a transparent plastic is injected into the cavity, and
 - the light waveguide is removed after the curing,
- arranging at least one light source at at least one lateral surface of the light waveguide.

21. Method according to claim 20, characterized in that the film in the mold of the injection molding apparatus is applied at all sides, and openings corresponding to the at least one light source are created in the film before the application for the passage of light radiation.

22. Method for manufacturing a light source elements, comprising the method steps

- manufacturing a light waveguide,
- manufacturing a film that reflects or diffusely back-scatters light that comprises a bottom surface and at least one lateral surface with a deep-drawing process,
- applying the film to the light waveguide,
- arranging at least one light source at at least one lateral surface of the light waveguide.

23. Method according to claim 22, characterized in that openings

corresponding to the at least one light source are created in the film before the application for the passage of light radiation.

24. Method according to one of the claims 20 through 23, characterized in that the film is coated or printed with white color.

5 25. Method according to one of the claims 20 through 24, characterized in that the film contains polycarbonate.